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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,281	03/26/2004	Gerald Duane Larue	H0006214	2263

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EXAMINER

TRIEU, THAI BA

ART UNIT PAPER NUMBER

3748

DATE MAILED: 02/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/812,281	<b>Applicant(s)</b> LARUE ET AL.	
	<b>Examiner</b> Thai-Ba Trieu	<b>Art Unit</b> 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-12, 16-23 and 26-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-23, 26 and 27 is/are allowed.
- 6) ☒ Claim(s) 1-9, 16-18 and 28 is/are rejected.
- 7) ☒ Claim(s) 10-12, and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

This Office action is in response to the Amendment filed on December 23, 2005.

Claims 20 and 22 were amended; and Claims 13-15 and 24-25 were cancelled.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

***Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Fisher et al. (Patent Number 5,131,807).***

Fischer discloses a turbocharger comprising:

a compressor (36) comprising a compressor housing and a compressor wheel mounted in the compressor housing (See figure 3);

a turbine (12) comprising a turbine housing and a turbine wheel mounted in the turbine housing (See Figure 3);

a shaft (not Numbered) connecting the compressor wheel to the turbine wheel (See Figure 3);

a one-piece center housing (Not Numbered) disposed between and mounted to the compressor and turbine housings (See Figure 3), the center housing defining a bore that receives the shaft therethrough (See Figure 3); and

a hydrodynamic foil bearing assembly (24, 26, 28) mounted in the bore of the center housing rotatably supporting the shaft, and comprising a foil thrust bearing assembly (24), a first foil journal bearing (26) located between the compressor wheel and the foil thrust bearing assembly (24), and a second foil journal bearing (28) located between the foil thrust bearing assembly (24) and the turbine wheel (See Figure 3);

wherein the center housing defines a cooling air supply passage (via 22) leading into the bore adjacent the thrust bearing assembly (24) for supplying cooling air to the foil thrust bearing assembly, the journal bearings (26, 28) define cooling passages arranged to receive said cooling air after said cooling air has cooled the foil thrust bearing assembly (24), and the center housing defines cooling air discharge passages (via 34) arranged to receive said cooling air after said cooling air has cooled the foil journal bearings (26, 28) (See Figure 3, Column 2, lines 14-32).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

***Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fischer et al. (Patent Number (5,131,807), in view of Fortmann et al. (Patent Number 4,402,618).***

Fischer discloses the invention as recited above; however, Fischer fails to disclose a first annular bearing carrier and a second annular bearing carrier.

Fortmann teaches that it is conventional in the bearing art, to utilize the first foil journal bearing (85) comprising a first annular bearing carrier (90) formed separately from and fixedly mounted in the center housing, and the second foil journal bearing (85) comprising a second annular bearing carrier formed separately from the center housing and first annular bearing carrier (90) and fixedly mounted in the center housing, each annular bearing carrier (90) mounting a foil along an inner surface of the annular bearing carrier (See Figure 1, Column 2, lines 67-68, and Column 3, lines 1-13).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized a first annular bearing carrier and a second annular bearing carrier, as taught by Fortmann, to improve the efficiency of the Fischer device, since the use thereof would have prevented the accommodation of excessive rotor axial displacements.

***Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fischer et al. (Patent Number (5,131,807), in view of Fortmann et al. (Patent Number 4,402,618), and further in view of either Nishijima et al. (Pub. Number US 2003/0169951 A1), or Hoffmann et al. (Pub. Number US 2005/0012411 A1).***

The modified Fischer discloses the invention as recited above; however, fails to disclose the annular bearing carriers being made of stainless steel and ceramic.

Nishijima/Hoffmann teaches that it is conventional in the foil bearing art, to utilize the annular bearing carriers being made of stainless steel and ceramic (See Figures 5 and 14, Paragraph [0101] of Nishijima; and Paragraph [0016] of Hoffmann).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the annular bearing carriers being made of stainless steel and ceramic, as taught by Nishijima/Hoffmann, to improve the efficiency of the modified Fischer device, since the use thereof would have reduced the heat transfer from the turbine to the foils.

***Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fischer et al. (Patent Number (5,131,807), in view of Fortmann et al. (Patent Number 4,402,618), and further in view of Obara et al. (Pub. Number US 2002/0039461 A1).***

The modified Fischer discloses the invention as recited above; however, fails to disclose the position of annular bearing carriers.

Obara teaches that it is conventional in the bearing art, to utilize each annular bearing carrier being mounted in the center housing by an undulating ring (18) mounted about the annular bearing carrier and abutting an inner surface of the bore in the center housing, the undulating rings helping to thermally isolate the foils from heat transfer from the turbine and serving to radially locate the annular bearing carriers in the bore of the center housing (See Figures 1, 5-6, and Paragraph [0035]-[0036]).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the position of annular bearing carriers, as taught by Obara, to improve the rotational accuracy of the bearings in the modified Fischer device.

***Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fischer et al. (Patent Number (5,131,807), in view of Swinton et al. (Pub. Number US 2002/0097928 A1).***

Fischer discloses the invention as recited above; however, Fischer fails to disclose the structural details of the foil thrust bearing assembly.

Swinton teaches that it is conventional in the foil thrust bearing art, to utilize the foil thrust bearing assembly comprising an annular thrust disk (not Numbered) and a pair of annular foil thrust bearings (328') respectively disposed adjacent opposite faces of the thrust disk, the annular bearing carriers disposed on opposite sides of the foil thrust bearing assembly with the annular bearing carriers being connected to each other so as to capture the foil thrust bearing assembly therebetween (See Figure 4); the thrust disk (Not Numbered) having a radially inner portion extending to a smaller radius than the inner surfaces of the annular bearing carriers, and the shaft connecting the turbine wheel to the compressor wheel comprising a stepped shaft (322) and a shaft sleeve, the stepped shaft (322) having a larger-diameter portion connected to the turbine wheel and journaled in the second journal bearing with an end of the larger-diameter portion abutting one side of the radially inner portion of the thrust disk, the stepped shaft having

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a smaller-diameter portion connected between the compressor wheel and the larger-diameter portion and extending through a central hole in the thrust disk, and the shaft sleeve being sleeved over and fixedly joined to the smaller-diameter portion and being journaled in the first journal bearing with an end of the shaft sleeve abutting an opposite side of the radially inner portion of the thrust disk (See Figure 4).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the structural details of the foil thrust bearing assembly, as taught by Swinton, to improve the efficiency of the Fischer device.

***Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fischer et al. (Patent Number (5,131,807), in view of Johnston et al. (Patent Number 5,857,332).***

Fischer discloses the invention as recited above; however, fails to disclose the center housing defining a water jacket therein for circulating cooling water for cooling the foil bearing assembly.

Johnston teaches that it is conventional in the bearing systems for a motor assisted turbocharger of the internal combustion engine art, to utilize the center housing having a water jacket therein for circulating cooling water for cooling the foil bearing assembly (See Column 3, lines 47-50).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the center housing defining a water jacket therein



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for circulating cooling water for cooling the foil bearing assembly, as taught by Johnston, to improve the efficiency of the Fischer device.

***Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fischer et al. (Patent Number (5,131,807), in view of Fortmann et al. (Patent Number 4,402,618), and further in view of Adeff (Patent Number 5,890,881).***

Fischer discloses the invention as recited above; however, fails to disclose seal rings, the position of each seal ring and the material of the seal rings.

Fortmann teaches that it is conventional in the bearing art, to utilize a first seal ring (110) disposed about an outer surface of the shaft adjacent the compressor wheel and a second seal ring (110) disposed about an outer surface of the shaft adjacent the turbine wheel, the seal rings being radially compressed between the shaft and stationary surfaces of the turbocharger for sealing the bearing assembly (See Figure 1).

Additionally, Adeff teaches that it is conventional in the turbocharger rotating seal, to utilize the seal ring being made of metal (66, 68) (Column 3, lines 64-67).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized seal rings, the position of each seal ring, as taught by Fortmann; and the material of the seal rings, as taught by Adeff, to improve the efficiency of the Fischer device.

***Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fischer et al. (Patent Number (5,131,807), in view of Malabre et al. (Patent Number 4,850,721).***

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Fischer discloses a turbocharger comprising:

- a compressor (36) comprising a compressor housing and a compressor wheel mounted in the compressor housing (See figure 3);

- a turbine (12) comprising a turbine housing and a turbine wheel mounted in the turbine housing (See Figure 3);

- a shaft (not Numbered) connecting the compressor wheel to the turbine wheel (See Figure 3);

- a one-piece center housing (Not Numbered) disposed between and mounted to the compressor and turbine housings (See Figure 3), the center housing defining a bore that receives the shaft therethrough (See Figure 3); and

- a hydrodynamic foil bearing assembly (24, 26, 28) mounted in the bore of the center housing rotatably supporting the shaft, and comprising a foil thrust bearing assembly (24) retained between first and second foil journal bearings (26, 28) (See Figure 3).

However, Fischer fails to disclose the bearing cartridge being insertable as a unit.

Malabre teaches that it is conventional in the hydrodynamic bearing art, to utilize the bearing cartridge being insertable as a unit into the bore of the center housing from an end of the center housing adjacent the compressor (See Column 2, lines 26-44).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the bearing cartridge being insertable as a unit, as taught by Malabre, to improve the performance efficiency of the Fischer device.

***Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fischer et al. (Patent Number (5,131,807), in view of Malabre et al. (Patent Number 4,850,721), and further in view of Fortmann et al. (Patent Number 4,402,618).***

The modified Fischer discloses the invention as recited above; however, fails to disclose a first annular bearing carrier and a second annular bearing carrier.

Fortmann teaches that it is conventional in the bearing art, to utilize the first foil journal bearing (85) comprising a first annular bearing carrier (90) formed separately from and fixedly mounted in the center housing, and the second foil journal bearing (85) comprising a second annular bearing carrier formed separately from the center housing and first annular bearing carrier (90) and fixedly mounted in the center housing, each annular bearing carrier (90) mounting a foil along an inner surface of the annular bearing carrier (See Figure 1, Column 2, lines 67-68, and Column 3, lines 1-13).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized a first annular bearing carrier and a second annular bearing carrier, as taught by Fortmann, to improve the efficiency of the modified Fischer device, since the use thereof would have prevented the accommodation of excessive rotor axial displacements.

***Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fischer et al. (Patent Number (5,131,807), in view of Malabre et al. (Patent Number 4,850,721) and Fortmann et al. (Patent Number 4,402,618), and further in view of Swinton et al. (Pub. Number US 2002/0097928 A1).***

The modified Fischer discloses the invention as recited above; however, fails to disclose the structural details of the foil thrust bearing assembly.

Swinton teaches that it is conventional in the foil thrust bearing art, to utilize the foil thrust bearing assembly comprising an annular thrust disk (not Numbered) and a pair of annular foil thrust bearings (328') respectively disposed adjacent opposite faces of the thrust disk, the annular bearing carriers disposed on opposite sides of the foil thrust bearing assembly with the annular bearing carriers being connected to each other so as to capture the foil thrust bearing assembly therebetween (See Figure 4) (See Figure 4).

It would has been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized the structural details of the foil thrust bearing assembly, as taught by Swinton, to improve the efficiency of the Fischer device.

***Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roby et al. (Patent Number 6,263,672), in view of Bosley (Patent Number 5,427,455).***

Robby discloses a method for operating a turbocharger having bearings (53) and having a turbine with a variable nozzle (332, 333) , wherein the variable nozzle is structured and arranged to receive exhaust gas from an engine and supply the exhaust gas to a turbine of the turbocharger, the method comprising partially closing the variable nozzle at engine idle condition so as to increase the idle speed of the turbocharger (See Figure 8 and 9, Column 6, lines 22-31).

However, Roby fails to disclose foil bearings and their function.

Bosley teaches that it is conventional in the hydrodynamic foil bearing art, to utilize foil bearings being applied in the turbocharger and being prevented from stalling and stopping during the engine idle condition to increase the turbocharger speed (See Column 1, lines 56-68, Column 2, lines 1-2, Column 5, lines 25-36, and column 13, lines 1-14).

It would have been obvious to one having ordinary skill in the art at that time the invention was made, to have utilized foil bearings and their function, as taught by Bosley, to improve the efficiency of the Roby device.

#### ***Allowable Subject Matter***

Claims 20-23 and 26-27 are allowed.

Claims 10-12, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Response to Arguments***

Applicant's arguments with respect to claims 1-12, 16-23, and 26-28 have been considered but are moot in view of the new ground(s) of rejection. Accordingly, claims 1-12, 16-23, and 26-28 are pending.

1. Regarding the Applicants' arguments set forth on pages 9-11 of the Amendment, applicants state that Fischer and Malabre in combination with Fischer do not teach or suggest a center housing, a hydrodynamic foil bearing assembly

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comprising a foil thrust assembly and a pair of journal bearings; and a bearing assembly being configured in order that the bearing cartridge is insertable as a unit into the bore of the center housing from one end of the center housing adjacent the compressor.

The examiner respectfully disagrees with the applicants, because Fischer and Malabre in combination with Fischer do disclose all the limitations claimed in claim 1 and 16 as set forth above.

2. According to the Applicants' arguments set forth on page 12 for the method claim 28, applicants state that at the time the present invention was made, both the present invention/application and U.S. Patent No. 6,964,522 to Kang et al. were owned by, or subject to an obligation of assignment to, Honeywell International, Inc. Kang is assigned to Honeywell International, Inc., as evidenced by an assignment recorded in the U.S. Patent and Trademark Office on Reel 014928, Frame 0887. The present application is also assigned to Honeywell International, Inc., as evidenced by an assignment recorded in the U.S. Patent and Trademark Office on Reel 015161, Frame 0196. As such, in accordance with 35 U.S.C. 103(c), Kang cannot be used in an obviousness rejection in the present application."

The rejection of claim 28 under 35 U.S.C. 103(c) as being unpatentable over Roby et al. (Patent Number 6,263,672), in view of Kang et al. (Patent Number 6,964,522 B2), has been withdrawn. However, the new rejection of claim 28 has been set forth above.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Nakata (Pub. Number US 2005/00135515 A1) discloses foil bearing.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thai-Ba Trieu whose telephone number is (571) 272-4867. The examiner can normally be reached on Monday - Thursday (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TTB  
February 15, 2006



Thai-Ba Trieu  
Primary Examiner  
Art Unit 3748